PATENT COOPERATION TREATY

9/171960 PCT

From the INTERNATIONAL BUREAU

NOTIFICATION OF ELECTION

(PCT Rule 61.2)

To:

United States Patent and Trademark Office
(Box PCT)
Crystal Plaza 2
Washington, DC 20231
ÉTATS-UNIS D'AMÉRIQUE

in its capacity as elected Office

Date of mailing: 01 April 1999 (01.04.99)	
International application No.: PCT/GB98/02808	Applicant's or agent's file reference: A25470 WO
International filing date: 16 September 1998 (16.09.98)	Priority date: 25 September 1997 (25.09.97)
Applicant: SPINDLEY, Robert, David et al	

1. The designated Office is hereby notified of its election made:

[X] in the demand filed with the International preliminary Examining Authority on:

12 January 1999 (12.01.99)

[ ] in a notice effecting later election filed with the International Bureau on:

2. The election [X] was

[ ] was not

made before the expiration of 19 months from the priority date or, where Rule 32 applies, within the time limit under Rule 32.2(b).

The International Bureau of WIPO 34, chemin des Colombettes 1211 Geneva 20, Switzerland Facsimile No.: (41-22) 740.14.35	Authorized officer: J. Zahra Telephone No.: (41-22) 338.83.38

PATENT COOPERATION TREATY

From the
INTERNATIONAL PRELIMINARY EXAMINING AUTHORITY

To:

WELLS, David
BT Group Legal Services
Intellectual Property Dept.
Holborn Centre, 8th floor
London EC1N 2TE
GRANDE BRETAGNE

RECEIVED
08 DEC 1999
IP FORMALITIES GROUP

PCT

NOTIFICATION OF TRANSMITTAL OF THE INTERNATIONAL PRELIMINARY EXAMINATION REPORT
(PCT Rule 71.1)

Date of mailing *(day/month/year)*	02.12.1999
Applicant's or agent's file reference: A25470 WO	**IMPORTANT NOTIFICATION**

International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB98/02808	16/09/1998	25/09/1997

Applicant
BRITISH TELECOMMUNICATIONS PUBLIC L. C. ....et al.

1. The applicant is hereby notified that this International Preliminary Examining Authority transmits herewith the international preliminary examination report and its annexes, if any, established on the international application.

2. A copy of the report and its annexes, if any, is being transmitted to the International Bureau for communication to all the elected Offices.

3. Where required by any of the elected Offices, the International Bureau will prepare an English translation of the report (but not of any annexes) and will transmit such translation to those Offices.

4. **REMINDER**

The applicant must enter the national phase before each elected Office by performing certain acts (filing translations and paying national fees) within 30 months from the priority date (or later in some Offices) (Article 39(1)) (see also the reminder sent by the International Bureau with Form PCT/IB/301).

Where a translation of the international application must be furnished to an elected Office, that translation must contain a translation of any annexes to the international preliminary examination report. It is the applicant's responsibility to prepare and furnish such translation directly to each elected Office concerned.

For further details on the applicable time limits and requirements of the elected Offices, see Volume II of the PCT Applicant's Guide.

Name and mailing address of the IPEA/	Authorized officer
European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Cremona, P Tel.+49 89 2399-8244

Form PCT/IPEA/416 (July 1992)

PATENT COOPERATION TREATY

PCT

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

(PCT Article 36 and Rule 70)

Applicant's or agent's file reference	FOR FURTHER ACTION	See Notification of Transmittal of International Preliminary Examination Report (Form PCT/IPEA/416)
A25470 WO		
International application No.	International filing date *(day/month/year)*	Priority date *(day/month/year)*
PCT/GB98/02808	16/09/1998	25/09/1997
International Patent Classification (IPC) or national classification and IPC H04Q3/66		
Applicant BRITISH TELECOMMUNICATIONS PUBLIC L. C. ....et al.		

1. This international preliminary examination report has been prepared by this International Preliminary Examining Authority and is transmitted to the applicant according to Article 36.

2. This REPORT consists of a total of 8 sheets, including this cover sheet.

   ☒ This report is also accompanied by ANNEXES, i.e. sheets of the description, claims and/or drawings which have been amended and are the basis for this report and/or sheets containing rectifications made before this Authority (see Rule 70.16 and Section 607 of the Administrative Instructions under the PCT).

   These annexes consist of a total of 4 sheets.

3. This report contains indications relating to the following items:

   - I ☒ Basis of the report
   - II ☐ Priority
   - III ☒ Non-establishment of opinion with regard to novelty, inventive step and industrial applicability
   - IV ☐ Lack of unity of invention
   - V ☒ Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations suporting such statement
   - VI ☐ Certain documents cited
   - VII ☒ Certain defects in the international application
   - VIII ☒ Certain observations on the international application

Date of submission of the demand	Date of completion of this report
12/01/1999	02.12.1999
Name and mailing address of the international preliminary examining authority: European Patent Office D-80298 Munich Tel. +49 89 2399 - 0 Tx: 523656 epmu d Fax: +49 89 2399 - 4465	Authorized officer Santacroce, J Telephone No. +49 89 2399 8804

Form PCT/IPEA/409 (cover sheet) (January 1994)

INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No. PCT/GB98/02808

I. Basis of the report

1. This report has been drawn on the basis of (*substitute sheets which have been furnished to the receiving Office in response to an invitation under Article 14 are referred to in this report as "originally filed" and are not annexed to the report since they do not contain amendments.*):

Description, pages:

1-10 as originally filed

Claims, No.:

1-20 as received on 27/09/1999 with letter of 21/09/1999

Drawings, sheets:

1/10-10/10 as originally filed

2. The amendments have resulted in the cancellation of:

☐ the description, pages:
☐ the claims, Nos.:
☐ the drawings, sheets:

3. ☐ This report has been established as if (some of) the amendments had not been made, since they have been considered to go beyond the disclosure as filed (Rule 70.2(c)):

4. Additional observations, if necessary:

III. Non-establishment of opinion with regard to novelty, inventive step and industrial applicability

The questions whether the claimed invention appears to be novel, to involve an inventive step (to be non-obvious), or to be industrially applicable have not been examined in respect of:

☐ the entire international application.

☒ claims Nos. 18-20.

because:

☐ the said international application, or the said claims Nos. relate to the following subject matter which does not require an international preliminary examination (*specify*):

☒ the description, claims or drawings (*indicate particular elements below*) or said claims Nos. 18-20 are so unclear that no meaningful opinion could be formed (*specify*):

see separate sheet

☐ the claims, or said claims Nos. are so inadequately supported by the description that no meaningful opinion could be formed.

☐ no international search report has been established for the said claims Nos. .

V. Reasoned statement under Article 35(2) with regard to novelty, inventive step or industrial applicability; citations and explanations supporting such statement

1. Statement

Novelty (N)	Yes:	Claims	1-17
	No:	Claims	
Inventive step (IS)	Yes:	Claims	
	No:	Claims	1-17
Industrial applicability (IA)	Yes:	Claims	1-17
	No:	Claims	

2. Citations and explanations

see separate sheet

VII. Certain defects in the international application

The following defects in the form or contents of the international application have been noted:

see separate sheet

VIII. Certain observations on the international application

The following observations on the clarity of the claims, description, and drawings or on the question whether the claims are fully supported by the description, are made:

see separate sheet

Indications relating to item V (novelty, inventive step and industrial applicability)

1. Document WO 95/35633 (hereinafter referred to as D1) discloses (see in particular page 14, line 18 to page 17, line 11; page 18, line 6 to page 19, line 16; page 20, line 8 to page 43, line 2; abstract), according to the essential features of **claim 1**, a method of operating a node in a communications network, which node is in use connected to a signal source external to the communications network (see abstract), the method comprising:
a) receiving from the said signal source signals which include a control field, which control field takes one of a plurality of possible values, and the subsequent handling of the said signal by the network being controlled according to the value of the control field (page 15, lines 1-9);
b) overwriting the control field with a value from a restricted subset of the plurality of possible values (page 15, lines 7-15); and
c) subsequently processing the signal in the network in dependance upon the said value from the restricted subset of the plurality of possible values (page 15, lines 16-36).

The method of D1 is thus substantially equivalent to the subject-matter of claim 1, making use of the same idea of providing an effective control of the use made of access to network by an external party, without requiring continual high-level screening of traffic through the node.

The subject-matter of claim 1 differs in fact from the disclosure of D1 merely in that the control field is overwritten **within a lower level of a messaging protocol running on the node and prior to the processing of the signal by higher level functions running on the node**.

Although D1 does not explicitly disclose the fact of overwriting the control field within a lower level of a messaging protocol running on the node and prior to the processing of the signal by higher level functions running on the node, the method according to D1 does in fact employ the SS7 protocol in an equivalent manner.

The fact of overwriting the control field within a lower level of a messaging

protocol running on the node and prior to the processing of the signal by higher level functions running on the node represents therefore in the light of D1 merely a common design measure within the normal range of options envisaged by a person skilled in the art.

The subject-matter of claim 1 does not therefore involve an inventive step (Article 33 (3) PCT).

The same objections as for claim 1 arise in respect of the **independent claims 2, 13, 14 and 15**.

The subject-matter of claims 2, 13, 14 and 15 does not therefore involve an inventive step (Article 33 (3) PCT).

2. The additional features of **dependent claims 3 to 7 and 16** are either known from D1, i.e. the use of a common channel signalling protocol and the use of the ITU-T Signalling System no. 7, or are considered to be common design measures within the normal range of options envisaged by a person skilled in this art.

Therefore, said features do not, either alone or in combination, add any inventive activity to claims 1, 2 and 15.

3. **Independent claims 8 and 17** correspond for the category "apparatus" to the method of claim 1, therefore the same objections arise as for claim 1 (reference is directed to paragraph 1. above).

The subject-matter of claims 8 and 17 does not therefore involve an inventive step (Article 33 (3) PCT).

The additional features of **dependent claims 9 and 10** are either known from D1 or are considered to be common design measures within the normal range of options envisaged by a person skilled in this art.

Therefore, said features do not, either alone or in combination, add any inventive

activity to claim 8.

The same objections as for claim 8 arise in respect of **claim 11** which defines merely a communications network including a node according to claim 8 or 9 or 10.

The subject-matter of claim 11 does not therefore involve an inventive step (Article 33 (3) PCT).

Indications relating to item VII (certain defects in the international application):

1. The independent claims are not in the two-part form in accordance with Rule 6.3 (b), (i), (ii) PCT, having a pre-characterising portion which correctly reflects the prior art of document D1.

2. Contrary to the requirements of Rule 5.1 (a) (ii) PCT, the cited document D1 is not acknowledged in the opening part of the description.

3. The claims are not provided with reference signs placed in parentheses relating to the technical features referred to therein, Rule 6.2 (b) PCT.

Indications relating to item III (non-establishment of opinion) and Indications relating to item VIII (certain observations on the international application)

1. The application contains 20 claims, including a plurality of independent claims, **having overlapping scope**. It does not seem that such a multiplicity of independent claims is strictly necessary and hence the number would not appear to be reasonable (Rule 6.1 (a) PCT); furthermore the claims themselves are **not clear and concise**, so that the requirements of Article 6 PCT are not met.

The claims to be filed to meet the above objections should contain only the

minimum number of independent claims necessary to clearly and sufficiently define the invention, with dependent claims as appropriate, Article 6 and Rule 6.4 PCT. In the present case it is considered appropriate to use only one independent claim per category.

2. Furthermore, **claim 18** does not meet the requirements of Article 6 and Rule 6.3 (a) PCT in that it does not define **clearly** the scope of the monopoly for which protection is sought and furthermore it does not contain the **essential features** which are necessary to carry out the invention.

In fact, the subject-matter of present claim 18 defines simply: "A method substantially as described with respect to the accompanying drawings".

The extent of protection which is sought is not clear because independent claim 18 does not contain any technical feature relating to the method.

Moreover, 18 does not meet the requirements of Rule 6.2 (a) PCT in that they rely on references to the drawings.

The same objections as for claim 18 arise also for **claims 19 and 20**.

CLAIMS

1. A method of operating a node in a communications network, which node is in use connected to a signal source external to the communications network, the method comprising:

a) receiving from the said signal source signals which include a control field, which control field takes one of a plurality of possible values, and the subsequent handling of the said signal by the network being controlled according to the value of the control field;

b) within a lower level of a messaging protocol running on the node, and prior to the processing of the signal by higher level functions running on the node, overwriting the control field with a value from a restricted subset of the plurality of possible values; and

c) subsequently processing the signal in the network in dependence upon the said value from the restricted subset of the plurality of possible values.

2. A method of operating a communications network comprising:

a) communicating control signals between nodes of the network, which control signals conform to a predetermined signalling protocol;

b) at one of the said nodes, receiving from a signal source external to the network signals conforming to the said predetermined protocol and including a control field, which control field takes one of a plurality of possible values;

c) within a lower level of a messaging protocol running on the node, and prior to the processing of the signal by higher level functions running on the node overwriting the control field with a value from a restricted subset of the plurality of possible values; and

d) subsequently processing the signal in the network in dependence upon the said value from the restricted subset of the plurality of possible values.

3. A method according to claim 1 or 2, in which step (c) is carried out within a data link layer interface, which data link layer interface is arranged to respond to service request from network layer functions of the node and to issue service requests to the communications network.

4. A method according to any one of the preceding claims, in which the said control field is a routing control field, and the overwriting of the routing control field with a predetermined value in step (b) limits the routing of signals to or from the external source to part only of the communications network.

5. A method according to claim 4, in which the routing of signals to or from the external source is limited to a point-to-point connection between the external source and the node.

6. A method according to any one of the preceding claims, in which the said signals conform to a common channel signalling protocol.

7. A method according to claim 6, in which the common channel signalling protocol is ITU-T Signalling System no. 7.

8. A node suitable for connection in a communications network and comprising:

a) a network interface for connection to the communications network;

b) a signal interface for connection to a signal source external to the communications network;

c) means connected to the signal interface for overwriting, within a lower level of a messaging protocol, a control field in a signal received via the signal interface from the signal source with one of a subset of predetermined values; and

d) signal processing means for processing the said signal in dependence upon the said one of a subset of predetermined values.

9. A node according to claim 8, in which the said means for overwriting are located within a data link layer interface, which data link layer interface is arranged to respond to service request from network layer functions of the node and to issue service requests to the communications network.

10. A node according to claim 8 or 9, in which the signal processing means are arranged to route the signal in dependence upon the value of the said control field.

11. A communications network including a node according to claim 8 or 9 or 10.

12. A communications network according to claim 11 including a common channel signalling network carrying signals conforming to a common channel signalling protocol and in which both the said network interface and the said signal interface are arranged to communicate signals conforming to the said common channel signalling protocol.

13. A method of operating a node in a communications network, which node is in use connected to a signal source external to the communications network, the method comprising:

a) receiving from the said signal source signals which include a control field, which control field takes one of a plurality of possible values, and the subsequent handling of the said signal by the network being controlled according to the value of the control field;

b) overwriting the control field with a value from a restricted subset of the plurality of possible values; and

c) subsequently processing the signal in the network in dependence upon the said value from the restricted subset of the plurality of possible values.

14. A method of operating a communications network comprising:

a) communicating control signals between nodes of the network, which control signals conform to a predetermined signalling protocol;

b) at one of the said nodes, receiving from a signal source external to the network signals conforming to the said predetermined protocol and including a control field, which control field takes one of a plurality of possible values;

c) overwriting the control field with a value from a restricted subset of the plurality of possible values; and

d) subsequently processing the signal in the network in dependence upon the said value from the restricted subset of the plurality of possible values.

15. A method of operating a node in a communications network, which node is in use connected to a signal source external to the communications network, the node including a data link layer interface arranged to respond to service request from network layer functions of the node and to issue service requests to the communications network the method comprising:

a) receiving from the said signal source signals which include a control field, which control field takes one of a plurality of possible values, and the subsequent handling of the said signal by the network being controlled according to the value of the control field;

b) within the data link layer interface overwriting the control field with a value from a restricted subset of the plurality of possible values; and

c) subsequently processing the signal in the network in dependence upon the said value from the restricted subset of the plurality of possible values.

16. A method according to any one of claims 1 to 7 or claim 15, including writing control field data received on each of a plurality of signalling links into respective signalling link data buffers, and overwriting the control fields in the respective data buffers with the said value.

17. A node arranged to operate in accordance with the method of claim 15 or 16.

18. A method substantially as described with respect to the accompanying drawings.

19. A node substantially as described with respect to the accompanying drawings.

20. A communications network substantially as described with respect to the accompanying drawings.

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PATENT COOPERATION TREATY

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INTERNATIONAL SEARCH REPORT

(PCT Article 18 and Rules 43 and 44)

Applicant's or agent's file reference	**FOR FURTHER ACTION** see Notification of Transmittal of International Search Report (Form PCT/ISA/220) as well as, where applicable, item 5 below.	
A25470 WO		
International application No.	International filing date *(day/month/year)*	(Earliest) Priority Date *(day/month/year)*
PCT/GB 98/ 02808	16/09/1998	25/09/1997
Applicant		
BRITISH TELECOMMUNICATIONS PUBLIC L. C. ....et al.		

This International Search Report has been prepared by this International Searching Authority and is transmitted to the applicant according to Article 18. A copy is being transmitted to the International Bureau.

This International Search Report consists of a total of 4 sheets.

[X] It is also accompanied by a copy of each prior art document cited in this report.

1. [ ] **Certain claims were found unsearchable** (see Box I).

2. [ ] **Unity of invention is lacking** (see Box II).

3. [ ] The international application contains disclosure of a **nucleotide and/or amino acid sequence listing** and the international search was carried out on the basis of the sequence listing
   - [ ] filed with the international application.
   - [ ] furnished by the applicant separately from the international application,
     - [ ] but not accompanied by a statement to the effect that it did not include matter going beyond the disclosure in the international application as filed.
   - [ ] Transcribed by this Authority

4. With regard to the **title,**
   - [ ] the text is approved as submitted by the applicant
   - [X] the text has been established by this Authority to read as follows:

   SIGNALING METHOD IN A TELECOMMUNICATIONS NETWORK

5. With regard to the **abstract,**
   - [X] the text is approved as submitted by the applicant
   - [ ] the text has been established, according to Rule 38.2(b), by this Authority as it appears in Box III. The applicant may, within one month from the date of mailing of this International Search Report, submit comments to this Authority.

6. The figure of the **drawings** to be published with the abstract is:

   Figure No. 1
   - [ ] as suggested by the applicant.
   - [X] because the applicant failed to suggest a figure.
   - [ ] because this figure better characterizes the invention.
   - [ ] None of the figures.

C. The special technical features, as defined in Rule 13.2 PCT, second sentence, included in claims 31 and 32 (and its dependent claims) with respect to this prior art are - using a count of the occupancy of resources, and rejecting messages or introducing gapping as appropriate to prevent overload, solving the objectively determined problem of use of limited network resources offered by a service provider.

D. The special technical features, as defined in Rule 13.2 PCT, second sentence, included in claim 38 (and its dependent claim) with respect to this prior art are - sending a test message to an out-of-service SCP and re-classifying the SCP as in-service if it responds properly, solving the objectively determined problem of monitoring the status of an SCP that has been determined as out-of-service.

E. The special technical feature, as defined in Rule 13.2 PCT, second sentence, included in claims 40 and 42 (and their dependent claims) with respect to this prior art is - introducing an auditable parameter into the IN message, solving the objectively determined problem of auditing IN messages, for security or other purposes.

Consequently, the claims do not fulfill the requirement of unity (Rule 13 PCT).

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/US 95/07077

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US-A-4310727	12-01-82	NONE	

INTERNATIONAL SEARCH REPORT

International Application No
PCT/GB 98/02808

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04Q3/66 H04Q3/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 95 35633 A (BELLSOUTH CORPORATION) 28 December 1995 see page 14, line 18 - page 17, line 11 see page 18, line 6 - page 19, line 16 see page 20, line 8 - line 9 see page 22, line 10 - page 43, line 2 ---	1-16
A	EP 0 726 682 A (AT&T IPM CORP.) 14 August 1996 see the whole document --- -/--	1-16

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

"A" document defining the general state of the art which is not considered to be of particular relevance

"E" earlier document but published on or after the international filing date

"L" document which may throw doubts on priority claim(s) or which is cited to establish the publication date of another citation or other special reason (as specified)

"O" document referring to an oral disclosure, use, exhibition or other means

"P" document published prior to the international filing date but later than the priority date claimed

"T" later document published after the international filing date or priority date and not in conflict with the application but cited to understand the principle or theory underlying the invention

"X" document of particular relevance; the claimed invention cannot be considered novel or cannot be considered to involve an inventive step when the document is taken alone

"Y" document of particular relevance; the claimed invention cannot be considered to involve an inventive step when the document is combined with one or more other such documents, such combination being obvious to a person skilled in the art.

"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 November 1998	19/11/1998

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	De Muyt, H

1

Form PCT/ISA/210 (second sheet) (July 1992)

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	LAWSER J J ET AL: "SIGNALLING SYSTEM NO. 7 REALIZATION FOR GLOBAL INTELLIGENT NETWORK SERVICES" INTELLIGENT NETWORKS: THE PATH TO GLOBAL NETWORKING, PROCEEDINGS OF THE INTERNATIONAL COUNCIL FOR COMPUTER COMMUNICATION INTELLIGENT NETWORKS CONFERENCE, TAMPA, MAY 4 - 6, 1992, 4 May 1992, pages 350-357, XP000684030 BAYLISS P W (ED) see page 355, paragraph 7 - page 356 ---	1-16
A	ZAHARYCHUK J ET AL: "GATEWAY SIGNAL TRANSFER POINTS: DESIGN, SERVICES AND BENEFITS" INTERNATIONAL CONFERENCE ON COMMUNICATIONS, INCLUDING SUPERCOMM TECHNICAL SESSIONS. ATLANTA, APR. 15 - 19, 1990, vol. 1 OF 4, 15 April 1990, pages 233-240, XP000147408 INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS ---	1-16
A	CHEN J C: "OPEN AIN OPERATIONS STRATEGIES" PROCEEDINGS OF THE NETWORK OPERATIONS AND MANAGEMENT SYMPOSIUM (NOM, KISSIMMEE, FEB. 14 - 17, 1994, vol. 1 OF 3, 14 February 1994, pages 140-152, XP000452403 INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS see the whole document ---	1-16
A	FERGUS J E: "SIGNALING NETWORK INTERCONNECTION" PROCEEDINGS OF THE NATIONAL COMMUNICATIONS FORUM, vol. 41, no. 1, 1987, pages 560-562, XP002026349 see page 561, paragraph 3 see page 562, paragraph 4 --- -/--	1-16

1

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
A	SEVCIK M ET AL: "CUSTOMERS IN DRIVER'S SEAT: PRIVATE INTELLIGENT NETWORK CONTROL POINT" ISS '95. WORLD TELECOMMUNICATIONS CONGRESS. (INTERNATIONAL SWITCHIN SYMPOSIUM), ADVANCED SWITCHING TECHNOLOGIES FOR UNIVERSAL TELECOMMUNICATIONS AT THE BEGINNING OF THE 21ST. CENTURY BERLIN, APR. 23 - 28, 1995, vol. 2, 23 April 1995, pages 41-44, XP000495622 VERBAND DEUTSCHER ELEKTROTECHNIKER (VDE) ET AL ---	1-16
A	US 5 430 719 A (WEISSER) 4 July 1995 see the whole document -----	1-16

1

INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/GB 98/02808

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
WO 9535633 A	28-12-1995	US 5701301 A	23-12-1997
		AU 2816995 A	15-01-1996
		CA 2191731 A	28-12-1995
		EP 0764383 A	26-03-1997
		JP 10501396 T	03-02-1998
EP 726682 A	14-08-1996	US 5664102 A	02-09-1997
		CA 2167235 A	08-08-1996
		CN 1134635 A	30-10-1996
		JP 8274874 A	18-10-1996
US 5430719 A	04-07-1995	AU 2189495 A	18-12-1995
		CA 2189264 A	30-11-1995
		EP 0765579 A	02-04-1997
		JP 10500819 T	20-01-1998
		WO 9532588 A	30-11-1995
		US 5701301 A	23-12-1997
		AU 691509 B	21-05-1998
		AU 7317594 A	17-01-1995
		CA 2165568 A	05-01-1995
		EP 0706743 A	17-04-1996
		JP 9501549 T	10-02-1997
		MX 9404860 A	31-01-1995
		NZ 269342 A	27-05-1998
		WO 9501063 A	05-01-1995
		US 5438568 A	01-08-1995

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WORLD INTELLECTUAL PROPERTY ORGANIZATION
International Bureau

INTERNATIONAL APPLICATION PUBLISHED UNDER THE PATENT COOPERATION TREATY (PCT)

(51) International Patent Classification 6 : 5000
H04Q 3/66, 3/00

A1

(11) International Publication Number: WO 99/16259

(43) International Publication Date: 1 April 1999 (01.04.99)

(21) International Application Number: PCT/GB98/02808

(22) International Filing Date: 16 September 1998 (16.09.98)

(30) Priority Data:
97307662.3 25 September 1997 (25.09.97) EP

(71) Applicant *(for all designated States except US)*: BRITISH TELECOMMUNICATIONS PUBLIC LIMITED COMPANY [GB/GB]; 81 Newgate Street, London EC1A 7AJ (GB).

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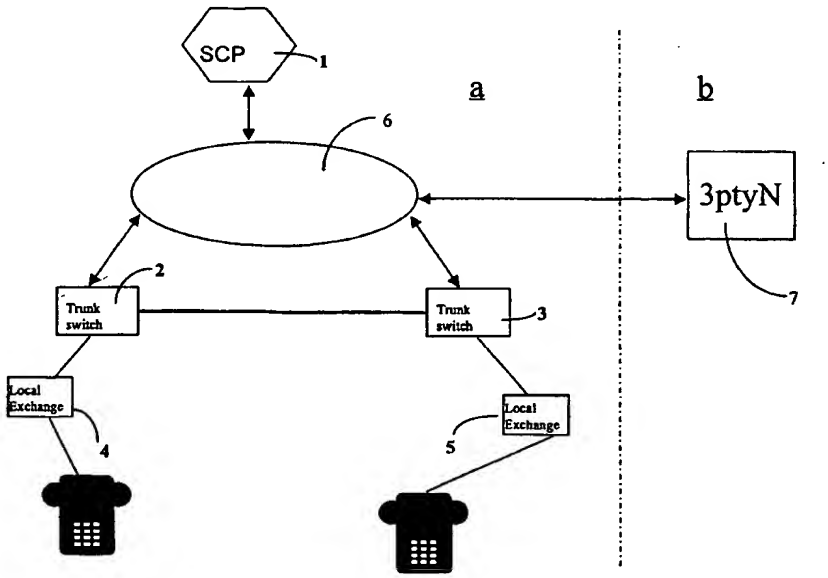

(57) Abstract

In a communications network, a network node is connected to a signal source external to the network. The node receives control signals including a control field which may take one of a number of different values. The node overwrites the control field with an allowed value determined by the network operator. The control field may determine the routing of signals, in which case the node by overwriting the control field may restrict the routing of signals from outside of the network to a simple point–to–point connection.

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SIGNALING METHOD IN A TELECOMMUNICATIONS NETWORK

The present invention relates to a communications network, and in particular to the handling of control signals passing between a network node and a source external to the network.

In the past, large communications networks, such as public switched telephony networks (PSTNs), have been used under the sole control of a single operator, and interactions with other networks and with devices external to the network have been simple and restricted in nature. Such networks have therefore been designed to offer a wide range of control functions within the network infrastructure but without these functions being exposed outside of the network. In recent years however, there has been an increasing need to interface networks with other networks, and to make at least part of the network functionality available to third parties who wish to provide a service to customers connected to the network. This then raises the problem of unauthorised use of the network. For example, the network operator may allow a third party to connect to an access node for processing of calls which originate or terminate in the network. This access must not be exploited by the third party for transfer routing of calls to or from customers located outside of the network without prior agreement. To prevent such unauthorised use, it has been necessary hitherto to screen all such traffic in order to bar any illicit use of the access point. However, this imposes heavy burdens in terms of data management, data storage and processing, and becomes increasingly impractical as the number of parties accessing the network in this way increases. To avoid such processing overheads, whilst preventing unauthorised access to the network, it has been proposed to use a different signalling protocol with restricted capabilities on the access link to that used within the network. This however necessitates modification of the access node in order to handle the additional protocol, and involves additional costs for both the network operator and the party accessing the network.

According to a first aspect of the present invention, there is provided a method of operating a node in a communications network, which node is in use connected to a signal source external to the communications network, the method comprising:

a) receiving from the said signal source signals which include a control field, which control field takes one of a plurality of possible values, and the subsequent handling of the said signal by the network being controlled according to the value of the control field;

b) overwriting the control field with a value from a restricted subset of the plurality of possible values; and

c) subsequently processing the signal in the network in dependence upon the said value overwritten in step (b).

According to a second aspect of the present invention, there is provided a method of operating a node in a communications network, which node is in use connected to a signal source external to the communications network, the method comprising:

a) receiving from the said signal source signals which include a control field, which control field takes one of a plurality of possible values, and the subsequent handling of the said signal by the network being controlled according to the value of the control field;

b) within a lower level of a messaging protocol running on the node, and prior to the processing of the signal by higher level functions running on the node, overwriting the control field with a value from a restricted subset of the plurality of possible values; and

c) subsequently processing the signal in the network in dependence upon the said value overwritten in step (b).

The present invention provides effective control of the use made of access to the network by an external party, without requiring continual high-level screening of traffic through the node, and without it being necessary to use a different signalling protocol to that adopted elsewhere in the network. This is achieved by overwriting control fields in the incoming signalling with allowed values determined by the network operator. The subsequent handling of the signal, and any consequent processing by the network, for example of a voice call, is then constrained by the values written in the control fields. It is particularly advantageous to overwrite the control field within a low level of the messaging protocol used to communicate with the node. In particular this may be done within the signalling link layer, that is the data link layer, layer 2 of the ISO 7-layer model. It is found that by providing security at this low level, the solution offered by the

present invention is made fast, robust and readily scaleable, by contrast with prior art systems which operate at an application level.

Preferably the said control field is a routing control field, and the overwriting of the routing control field with a predetermined value in step (b) limits the routing of signals to or from the external source to part only of the communications network. Preferably the routing of signals to or from the external source is limited to a point-to-point connection between the external source and the node.

Often, a third party will be given a connection to an access node with the intention that it should be used as a simple point-to-point link for direct transfer of signals into or out of the network. However, depending on the values set in the routing control fields of the incoming signals, the third party might extend its access to further nodes beyond the original access node. This might be done, for example, in order to implement transfer routing through the network to another party outside of the network. This preferred aspect of the invention prevents this by overwriting the routing control fields. In the case of a network employing ITU-T Signalling System No. 7 (SS7), the relevant control fields are the originating point code (OPC) and destination point code (DPC) and the access node overwrites one or both of these codes. The OPC may be overwritten with the point code of the external signal source, and the DPC may be overwritten with the point code of the access node.

SS7 is a widely adopted and stable protocol for common channel signalling in communications networks. It is a highly flexible protocol which makes possible a wide range of control functions. The present invention is particularly advantageous in this context since it allows use of the SS7 protocol without modification for access signalling whilst effectively constraining the use made of the protocol.

The invention is by no means limited to use with routing control codes. It may also advantageously be implemented, for example, by overwriting a code which identifies the originating network for a signal. This code may be the Network Identifier Code specified in the SS7 NUP (national user part) protocol, and published in the BT National Requirements document BTNR 167, Issue 3, July 1987, Vol. 1. Overwriting this code can provide another means to prevent use of the network as a transit network, or can be used to ensure appropriate billing of

traffic when this depends on the originating network. Overwriting such a code may be carried out in addition to, or alternatively in place of, overwriting point codes.

The invention is not limited to use with SS7, but may also be used with different network protocols, including, for example, Internet Protocol or the X25 packet data protocol.

According to a second aspect of the present invention, there is provided a method of operating a communications network comprising:

a) communicating control signals between nodes of the network, which control signals conform to a predetermined signalling protocol;

b) at one of the said nodes, receiving from a signal source external to the network signals conforming to the said predetermined protocol and including a control field, which control field takes one of a plurality of possible values;

c) overwriting the control field with a value from a restricted subset of the plurality of possible values; and

d) subsequently processing the signal in the network in dependence upon the said value overwritten in step (c).

According to a further aspect of the present invention there is provided node suitable for connection in a communications network and comprising:

a) a network interface for connection to the communications network;

b) a signal interface for connection to a signal source external to the communications network;

c) means for overwriting with one of a subset of predetermined values a control field in a signal received via the signal interface from the signal source; and

d) signal processing means for processing the said signal in dependence upon the value of the said control field.

According to a further aspect of the present invention, there is provided a node suitable for connection in a communications network and comprising:

a) a network interface for connection to the communications network;

b) a signal interface for connection to a signal source external to the communications network;

c) means connected to the signal interface for overwriting, within a lower level of a messaging protocol, a control field in a signal received via the signal interface from the signal source with one of a subset of predetermined values; and

d) signal processing means for processing the said signal in dependence upon the value of the said control field.

The invention also encompasses networks adapted to operate in accordance with the first or second aspects.

Systems embodying the present invention will now be described in further detail, by way of example only, with reference to the accompanying drawings, in which:

Figure 1 is a schematic of a network embodying the invention;

Figure 2 is a schematic showing switching points in the network of Figure 1;

Figure 3 is a diagram showing a SS7 protocol stack;

Figure 4 is a diagram showing the format of a SS7 Message Signalling Unit (MSU);

Figure 5 is an SDL (Specification and Description Language) definition of processes implementing the present invention;

Figure 6 is an SDL definition of an alternative embodiment;

Figure 7 is a further SDL diagram, indicating the operation point of the invention;

Figure 8 is a diagram showing an example digital local exchange;

Figure 9 is a diagram showing in further detail the signalling hardware module in the exchange of Figure 8; and

Figure 10 shows a further embodiment of the invention in a network using internet protocols.

A telecommunications network which uses an IN (Intelligent Network) architecture includes a service control point (SCP) 1. The service control point 1 is connected to digital trunk switching units 2 ,3 (also termed "trunk switches") and to digital local exchanges (DLE's) 4,5 (also termed "local switches"). The switches in this example also function as service switching points (SSP's). At certain points during the progress of a call, the SSP's transfer information related to the call to the service control point. The service control point carries out functions such as number translation, and may control collection of additional call related

information. The trunk switches communicate with each other and with the service control point via the signalling network 6. The components so far described are all within the network, in the region referenced a, and are under the control of the network operator. A third party node (3ptyN) is located outside of the network in the region referenced b and connects to the network at an access node using the signalling protocol of the common channel signalling network. In the present example, this protocol is ITU-T Signalling System No. 7 (SS7). For a full description of SS7, reference is made to the ITU recommendations {Q.700/1/2/3/4/5/6/7/8}. - Specification of signalling system No.7; and the journal British Telecommunications Engineering, vol. 7 , part 1, April 1988, "CCITT Signalling System No.7".

Figure 2 shows schematically SS7 switching points referenced A, B and C. These correspond respectively to trunk switch 3, to the third party node and to the SCP 1. The operator of the network in region A sanctions access by the third party to the network, for example in order to provide a number translation service to customers connected to the network. It is agreed with the service provider, or other operator that the third party node will use a direct SS7 signalling link to trunk switch 3, and will not access other nodes of the network such as the SCP 1, and will not use access to the SS7 signalling network for transfer routing of calls.

Figure 3 shows the SS7 protocol stack. One characteristic feature of the SS7 protocol is the use of modular structure in which application-dependent functions in a layer termed the *User part* 32 are supported by a lower level transport protocol, termed the *Message transfer part* (MTP) 31 . The MTP has a three-level structure. Level 1 includes the physical signalling data link. In a digital network this is provided by a predetermined one of a number of time slots in a PCM system operating at, e.g. 64kbit/s. Level 2 includes the hardware of the signalling terminal together with the functions necessary to translate between processor software signals and the bit stream of the signalling data link. Level 3 comprises signalling network functions including functions for the transfer of messages, for the reconfiguration of routes after failure, and for sending information about faults in the signalling network.

Figure 4 shows the format of a message signalling unit (MSU) which is handled by a Signal Message Handling function of Level 3 of MTP. A message is delivered to the Level 3 of the MTP which adds some information and then passes

it to Level 2. Level 2 headers are added and the MSU is output for transmission on the SS7 signalling network. In addition to the Level 2 headers, and user information for use by the Level 4 application, the MSU contains the following fields:

DPC - destination point code

OPC - originating point code

SIO - service information octet

SLS - signalling link selection.

The OPC and DPC fields are each 14 bits long, and in conjunction with the Network Indicator code contained in the SIO field, form the complete point code of a particular node.

In the present example, an interconnect agreement between the network operator specifies that SS7 traffic between nodes B and A should be limited to a simple duplex connection. If this agreement is adhered to, then all SS7 MSU's sent by the node B to the access node A should have code-A in the DPC field, where code-A is the 14 bit point code of the access node A. Similarly the MSU's should have code-B in the OPC field, where code-B is the 14 bit point code of the interconnected network or service provider, at node B. If however the data is incorrectly defined at the nodes, then these fields may contain other values. For example, in implementing transfer routing, the service node might write a value for the DPC field which is not code-A, but is the point code of another node, outside of region a of the network. To eliminate the possibility of such breaches, without imposing a heavy processing overhead, the signalling link hardware in the access node, which implements Level 2 of the MTP, overwrites the OPC and DPC fields of SS7 signalling from the third party node with the allowed values, namely code-B and code-A respectively, also ensuring that the correct Network Indicator is applied. In addition, or alternatively, other parts of the MSU may be overwritten. In particular, as discussed in the introduction above, the NUP (national user part) identifier may be overwritten with the value corresponding to the party operating node B.

Figure 5 is an SDL diagram showing the modifications made to Level 2 MTP in order to implement the policing function described above. Feature data for each signalling link indicates whether the relevant link is to be policed or not. In step s1 the feature data is tested. If the link is to be policed then in step s2 the

OPC of the incoming MSU is tested to see whether it has the allowed value. If it has not, then in step s3 the OPC is overwritten with the allowed value and in step s4 the policing violation is notified to an alarm process. Similarly, in step s5, the DPC is tested to see whether it has the allowed value, and in steps s6 and s7 it is overwritten and a policing violation notified if the DPC is not the allowed value for that link. Following these steps, the Level 2 processing of signalling continues in a conventional fashion, and the resulting MSU's are passed to Level 3 of the MTP, where routing and message handling functions are carried out on the basis of the DPC and OPC values which are guaranteed to be permitted value. Accordingly further policing is not required in Level 3. The process of Figure 5 is shown by way of example only, and other implementations are possible. For example, the DPC may be checked, and if necessary may be overwritten, prior to the OPC being checked.

Figure 6 shows the modified SDL of an alternative embodiment. Initially, as in the first embodiment, the feature data is tested to determine whether the policing flag has been set (s61). In addition, a test is carried out to determine whether another flag in the feature data indicating that an alarm function is required has been set (s62). If this flag has not been set, that is to say if policing is required without an alarm function, then in steps s63 and s64 the OPC and DPC codes are overwritten unconditionally. Otherwise, in steps s65 and s66, the OPC and DPC codes are tested, and the codes overwritten and alarms raised depending on the outcome of the

tests, as described previously in relation to the first embodiment.

The modified SDL of the first or second embodiments may be substituted in the Basic Transmission Control SDL of the SS7 standard published in ITU Q.703 Figure 14, sheet 5 of 6. The position of the new SDL required by the invention is illustrated in Figure 7, in which the new SDL is shown in bold. In implementing the invention, an instance of the processes defined by the SDL is created for each link handled by the node. In this way, the policing function is inherently scaleable, by contrast with methods previously adopted in which policing was carried out entirely in software and in a much higher level of the protocol stack, where one function would be required to handle many links.

Figure 8 shows an example of a network node, in this case a digital local exchange, implementing the invention. It will be understood that this is chosen by

way of illustration only, and that the invention may be implemented on a wide range of different platforms. The principal elements of the exchange comprise transmission equipment 81, a digital switch 82, signalling transport hardware for the signalling links 83, signalling hardware modules 84, and processor systems 85 that control all the elements for either normal call processing or management activity. Each signalling transport hardware modules terminates a number, e.g. 16, signal links, each link comprising a pair of incoming and outgoing signals respectively. For each link there is provided within the SS7 signalling transport hardware, a respective input buffer and output buffer, and cyclic redundancy check (CRC) system that performs basic error checking on the received message. If the computed check-sum value has the expected value, then the signal is passed upwards to the signalling processor and subsequently on to the call processing system which executes basic call processing functions. If however, a bit error is encountered the message is immediately discarded. The processor system constantly monitors the buffers to ensure that when an incoming signal is received the input buffers can accommodate it. If full, the processor writes a TFC (transfer controlled) message via the output buffer of the respective link. Otherwise the signal is transferred to the other signalling hardware 84. The other signalling hardware discriminates signals addressed to the node from other signals using the MTP OPC DPC codes. If the DPC is not that of this node, then it directs the signal back through the signalling transport hardware to a relevant output link. In addition, in a node embodying the invention, the other signalling hardware carries out a policing function which overwrites OPC and DPC codes, using the processes defined in the SDL described above. Figure 9 shows in further detail the structure of the other signalling hardware. A microprocessor 91 is linked by a control interface 92 to firmware 93, which may include an EPROM, and to buffers B1, B2,... . Although for ease of illustration only two buffers are shown, in practice buffer capacity is provided for each link handled by the signalling hardware. The policing function already described is executed by software processes running on the microprocessor 91, in combination with firmware and hardware operations. In particular, instructions to overwrite selected bytes held in a buffer are downloaded from the microprocessor to the firmware. In this example, this results in the byte position corresponding to the NUP Network Identifier, the byte position corresponding to the OPC and the byte position

corresponding to the DPC being overwritten with predetermined allowed values which are specific to a particular SS7 signalling link, referenced Link 1. Then the signal is passed upwards to the call processing system which executes basic call processing functions. The signalling hardware functions autonomously, but may pass alarm signals, such as those generated as a result of checking OPC/DPC values, to the management systems.

Although in Figure 8 just a single instance of each element is shown, in practice the exchange will usually comprise a single Call Processing System connected to multiple processes. Each processor may consolidate traffic from a hierarchy of transport processes and signalling hardware modules.

Figure 10 shows a future alternative embodiment of the invention. In this case region a is private network using internet protocols, i.e. an intranet. A node 102 external to the private network, in region b, is connected to a node 101 in region a. This might be done, for example, in order to provide access to certain web pages running on a web server at the node in region a. The node in region has, in this example, internet address 111.111.1.111 and the node in region b has internet address 123.123.1.123. In order to prevent access by the region b node to other nodes 103, 104, node 101 overwrites the destination internet address and the return internet address of incoming packets from node 102 with the allowed values, namely 111.111.1.111 and 123.123.1.123. As in the previous examples, an alarm may be raised if either of these addresses in an incoming packet has an illicit value. The steps of testing and overwriting the network addresses is carried out in the network interface, for example in an X25 or ethernet interface card, before the packet is passed to the internet protocol (IP) layer of the software on the node 101. The function of the IP layer can therefore remain entirely conventional and it is not necessary at this level to distinguish between packets originating elsewhere on the intranet and packets originating from an external source such as node 102.

CLAIMS

1. A method of operating a node in a communications network, which node is in use connected to a signal source external to the communications network, the method comprising:

a) receiving from the said signal source signals which include a control field, which control field takes one of a plurality of possible values, and the subsequent handling of the said signal by the network being controlled according to the value of the control field;

b) within a lower level of a messaging protocol running on the node, and prior to the processing of the signal by higher level functions running on the node, overwriting the control field with a value from a restricted subset of the plurality of possible values; and

c) subsequently processing the signal in the network in dependence upon the said value overwritten in step (b)

2. A method of operating a communications network comprising:

a) communicating control signals between nodes of the network, which control signals conform to a predetermined signalling protocol;

b) at one of the said nodes, receiving from a signal source external to the network signals conforming to the said predetermined protocol and including a control field, which control field takes one of a plurality of possible values;

c) within a lower level of a messaging protocol running on the node, and prior to the processing of the signal by higher level functions running on the node overwriting the control field with a value from a restricted subset of the plurality of possible values; and

d) subsequently processing the signal in the network in dependence upon the said value overwritten in step (c).

3. A method according to claim 1 or 2, in which step (c) is carried out within a data link layer interface, which data link layer interface is arranged to respond to service request from network layer functions of the node and to issue service requests to the communications network.

4. A method according to any one of the preceding claims, in which the said control field is a routing control field, and the overwriting of the routing control field with a predetermined value in step (b) limits the routing of signals to or from the external source to part only of the communications network.

5. A method according to claim 4, in which the routing of signals to or from the external source is limited to a point-to-point connection between the external source and the node.

6. A method according to any one of the preceding claims, in which the said signals conform to a common channel signalling protocol.

7. A method according to claim 6, in which the common channel signalling protocol is ITU-T Signalling System no. 7.

8. A node suitable for connection in a communications network and comprising:

a) a network interface for connection to the communications network;

b) a signal interface for connection to a signal source external to the communications network;

c) means connected to the signal interface for overwriting, within a lower level of a messaging protocol, a control field in a signal received via the signal interface from the signal source with one of a subset of predetermined values; and

d) signal processing means for processing the said signal in dependence upon the value of the said control field.

9. A node according to claim 8, in which the said means for overwriting are located within a data link layer interface, which data link layer interface is arranged to respond to service request from network layer functions of the node and to issue service requests to the communications network.

10. A node according to claim 8 or 9, in which the signal processing means are arranged to route the signal in dependence upon the value of the said control field.

11. A communications network including a node according to claim 8 or 9 or 10.

12. A communications network according to claim 11 including a common channel signalling network carrying signals conforming to a common channel signalling protocol and in which both the said network interface and the said signal interface are arranged to communicate signals conforming to the said common channel signalling protocol.

13. A method of operating a node in a communications network, which node is in use connected to a signal source external to the communications network, the method comprising:

a) receiving from the said signal source signals which include a control field, which control field takes one of a plurality of possible values, and the subsequent handling of the said signal by the network being controlled according to the value of the control field;

b) overwriting the control field with a value from a restricted subset of the plurality of possible values; and

c) subsequently processing the signal in the network in dependence upon the said value overwritten in step (b)

14. A method of operating a communications network comprising:

a) communicating control signals between nodes of the network, which control signals conform to a predetermined signalling protocol;

b) at one of the said nodes, receiving from a signal source external to the network signals conforming to the said predetermined protocol and including a control field, which control field takes one of a plurality of possible values;

c) overwriting the control field with a value from a restricted subset of the plurality of possible values; and

d) subsequently processing the signal in the network in dependence upon the said value overwritten in step (c).

15. A method of operating a node in a communications network, which node is in use connected to a signal source external to the communications network, the node including a data link layer interface arranged to respond to service request from network layer functions of the node and to issue service requests to the communications network the method comprising:

a) receiving from the said signal source signals which include a control field, which control field takes one of a plurality of possible values, and the subsequent handling of the said signal by the network being controlled according to the value of the control field;

b) within the data link layer interface overwriting the control field with a value from a restricted subset of the plurality of possible values; and

c) subsequently processing the signal in the network in dependence upon the said value overwritten in step (b).

16. A method according to any one of claims 1 to 7 or claim 15, including writing control field data received on each of a plurality of signalling links into respective signalling link data buffers, and overwriting the control fields in the respective data buffers with the said value.

17. A node arranged to operate in accordance with the method of claim 15 or 16.

18. A method substantially as described with respect to the accompanying drawings.

19. A node substantially as described with respect to the accompanying drawings.

20. A communications network substantially as described with respect to the accompanying drawings.

Figure 1

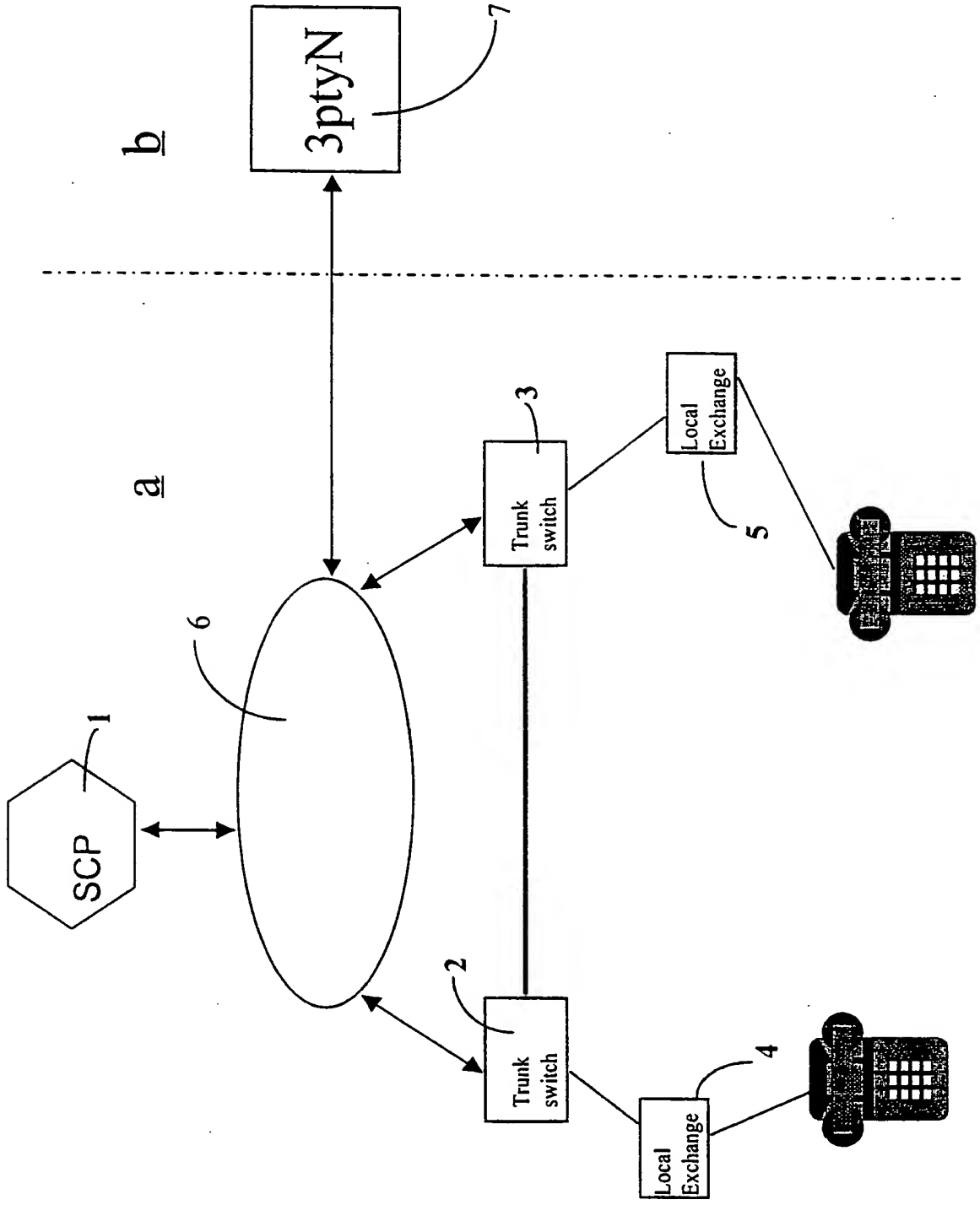

b
3ptyN
7
a
Trunk switch
3
Local Exchange
5
6
SCP
1
Trunk switch
2
Local Exchange
4

Figure 2

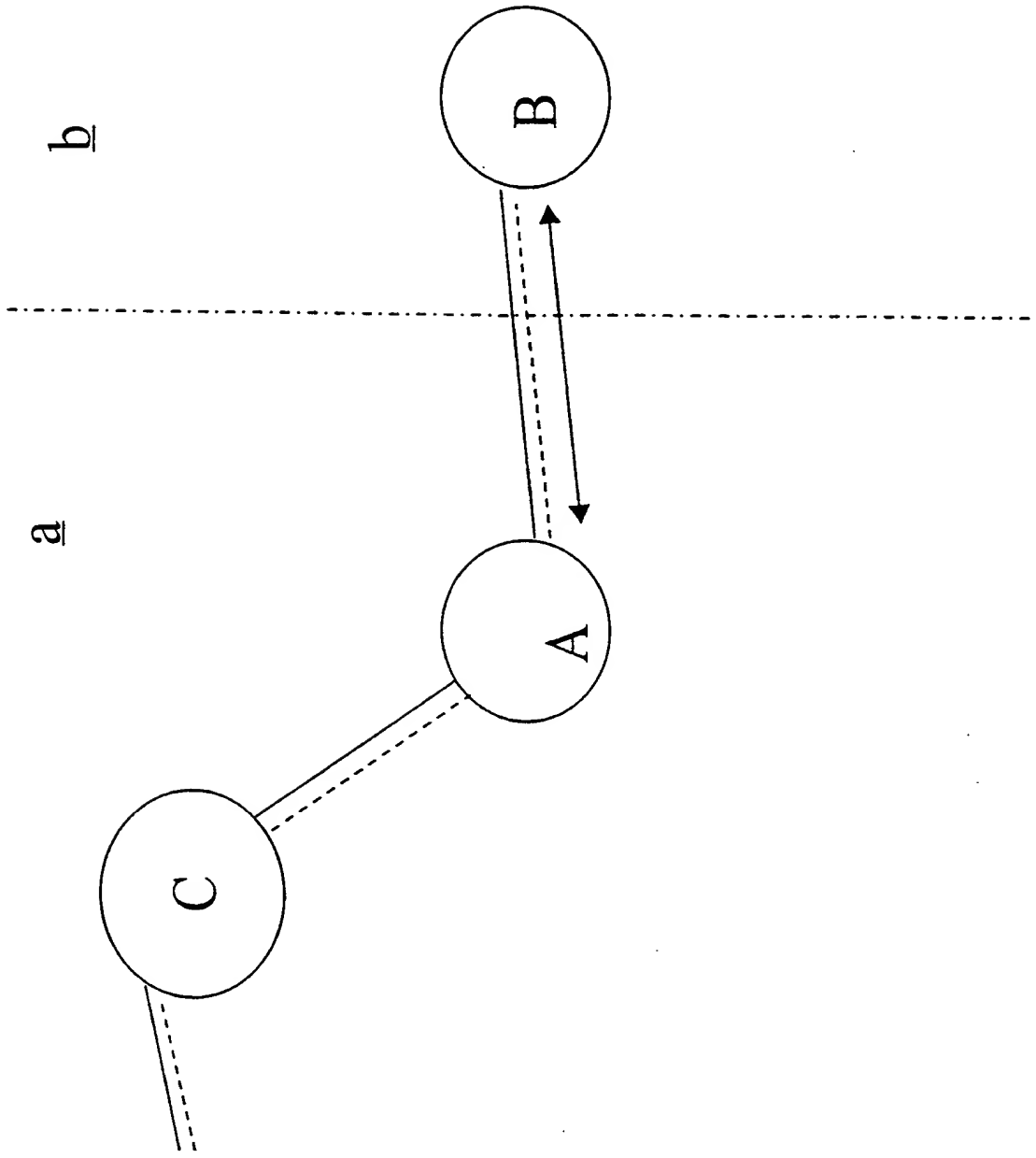


Figure 3

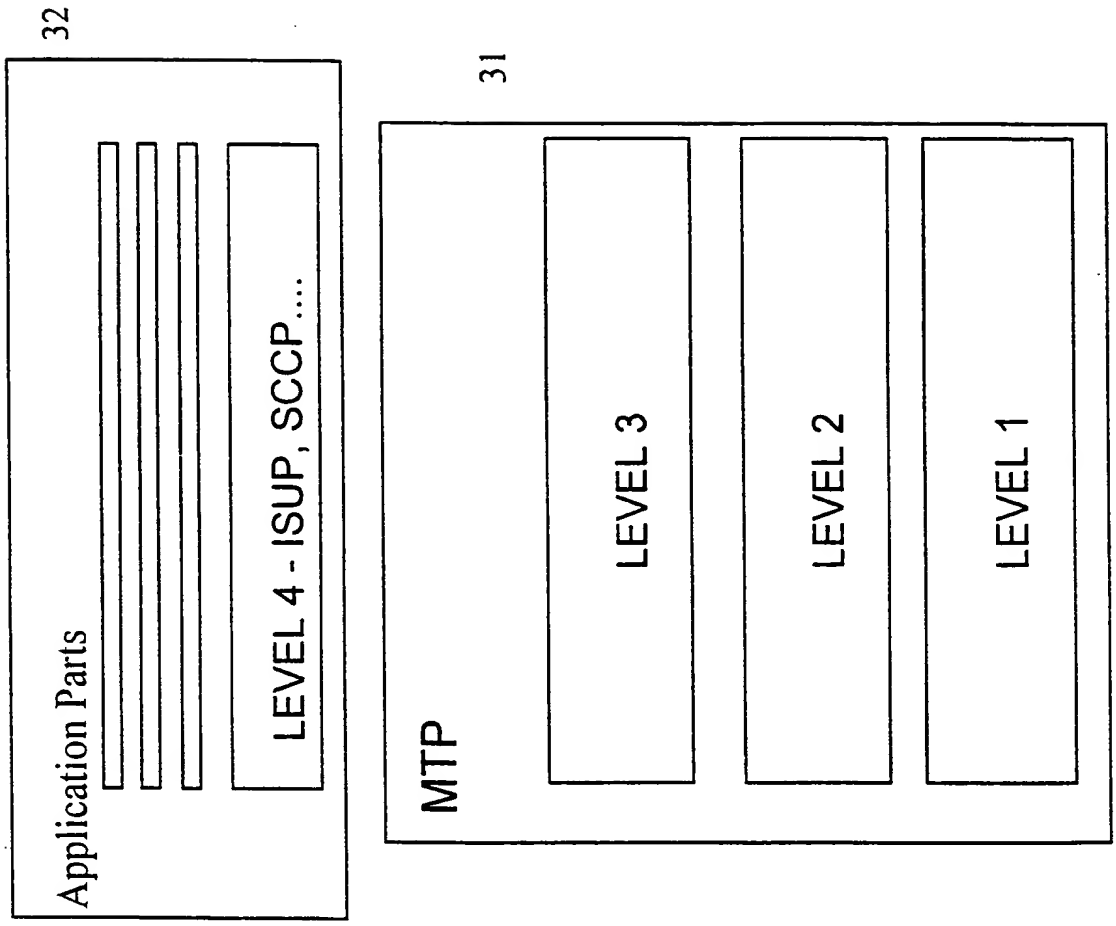

32
Application Parts
LEVEL 4 - ISUP, SCCP....
31
MTP
LEVEL 3
LEVEL 2
LEVEL 1

Figure 4

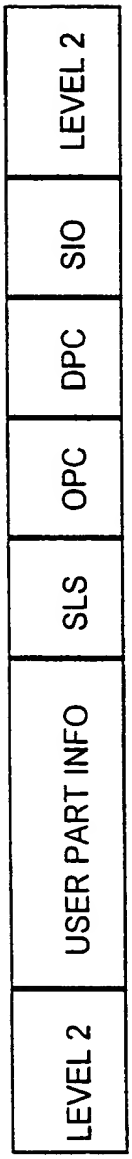


Figure 5

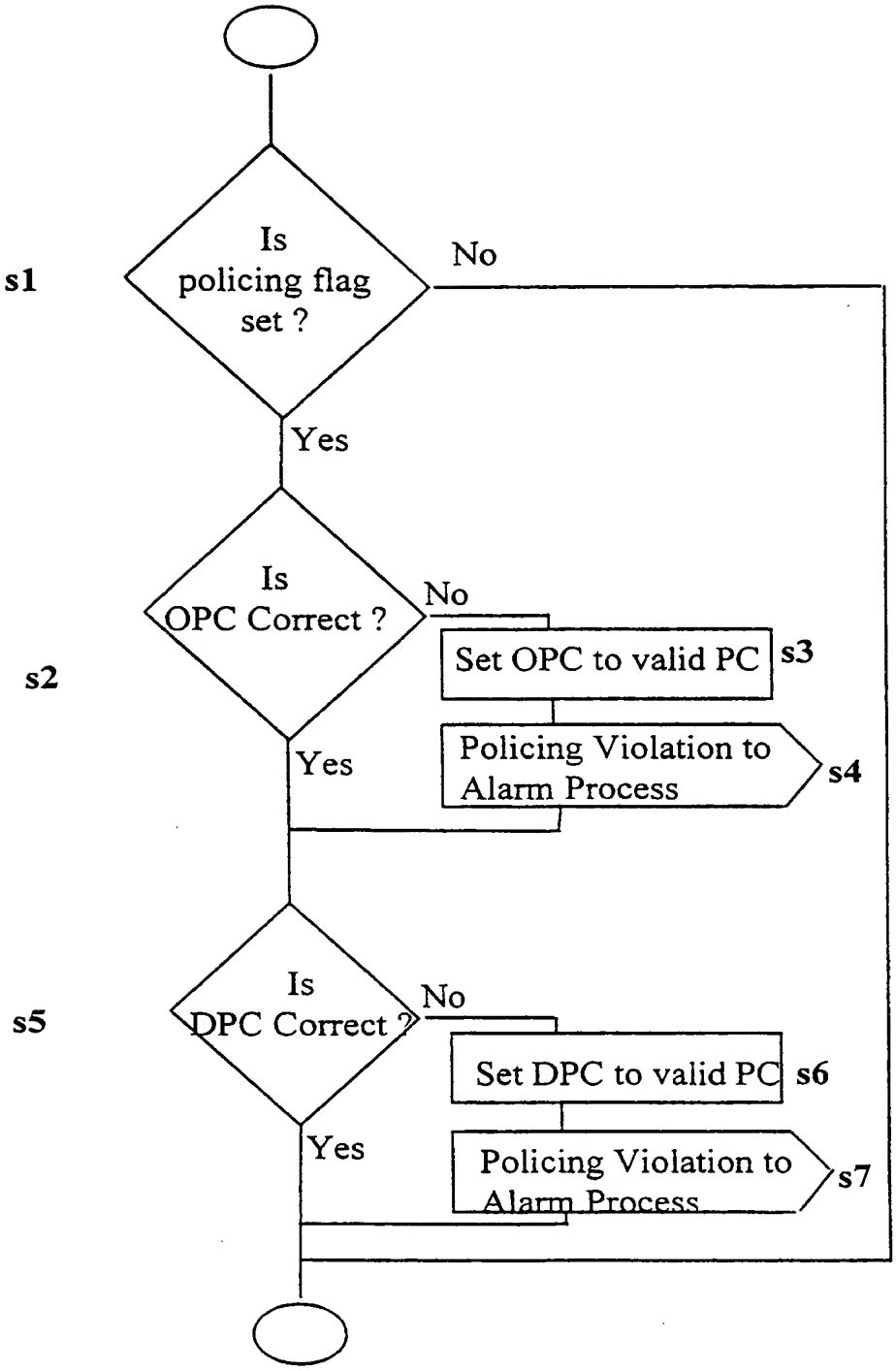

Is policing flag set ?
s1
No
Yes
Is OPC Correct ?
s2
No
Set OPC to valid PC
s3
Policing Violation to Alarm Process
s4
Yes
Is DPC Correct ?
s5
No
Set DPC to valid PC
s6
Policing Violation to Alarm Process
s7
Yes

Figure 6

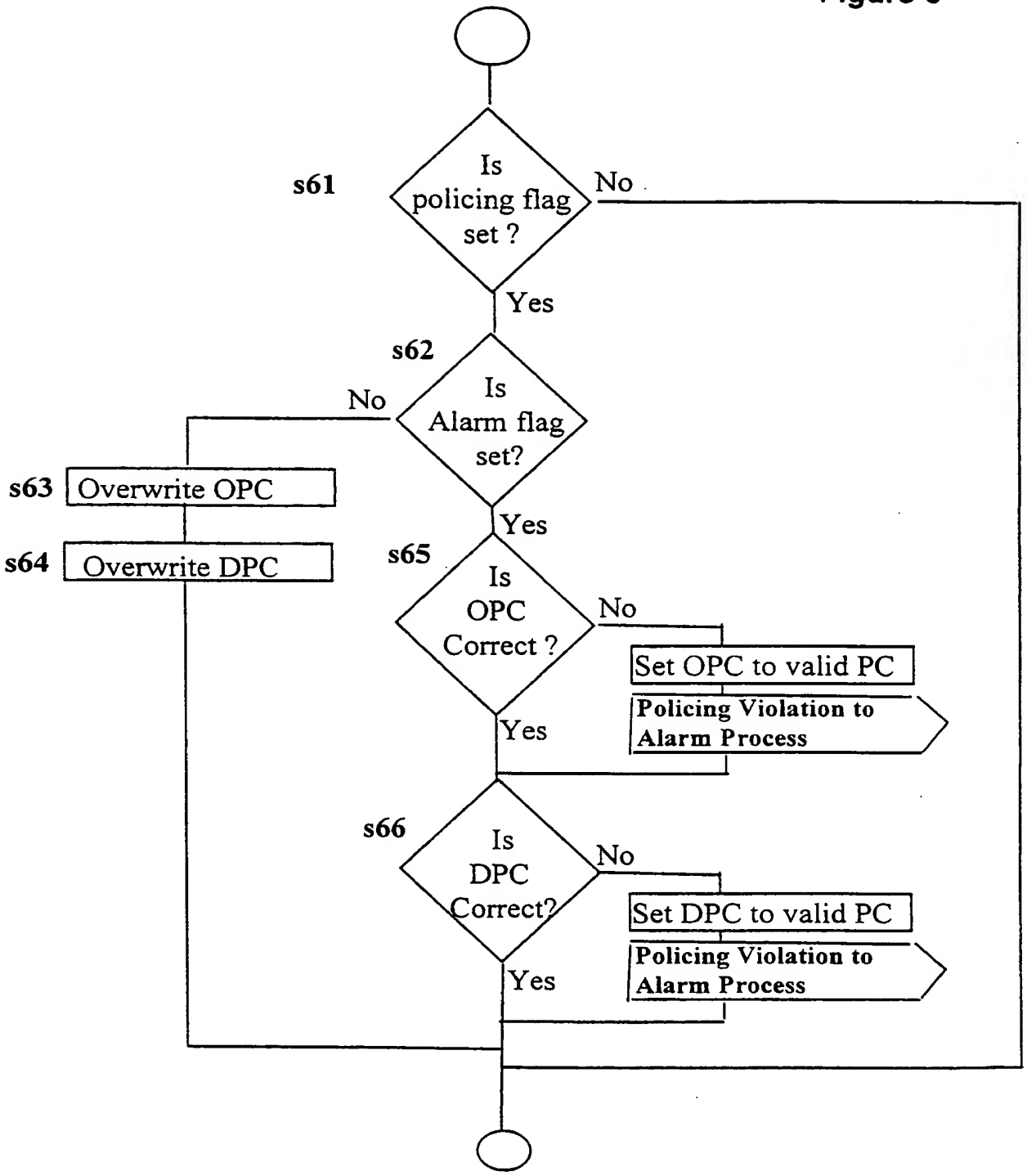

s61
Is policing flag set ?
No
Yes
s62
Is Alarm flag set?
No
Yes
s63
Overwrite OPC
s64
Overwrite DPC
s65
Is OPC Correct ?
No
Set OPC to valid PC
Policing Violation to Alarm Process
Yes
s66
Is DPC Correct?
No
Set DPC to valid PC
Policing Violation to Alarm Process
Yes

Figure 7

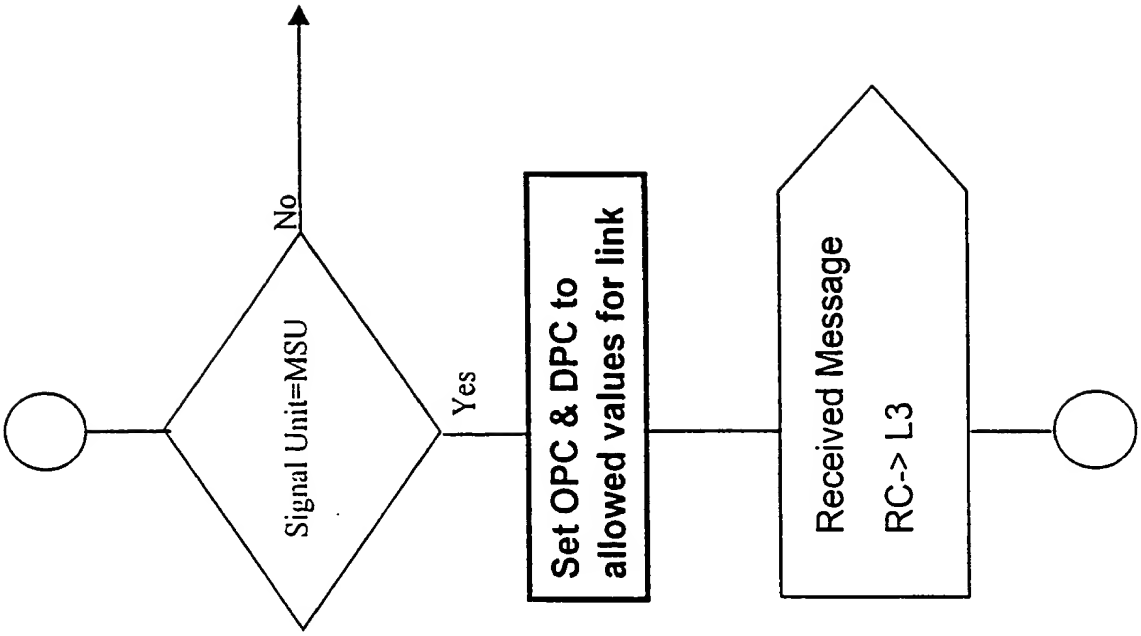

No
Signal Unit=MSU
Yes
Set OPC & DPC to allowed values for link
Received Message
RC-> L3

Figure 8

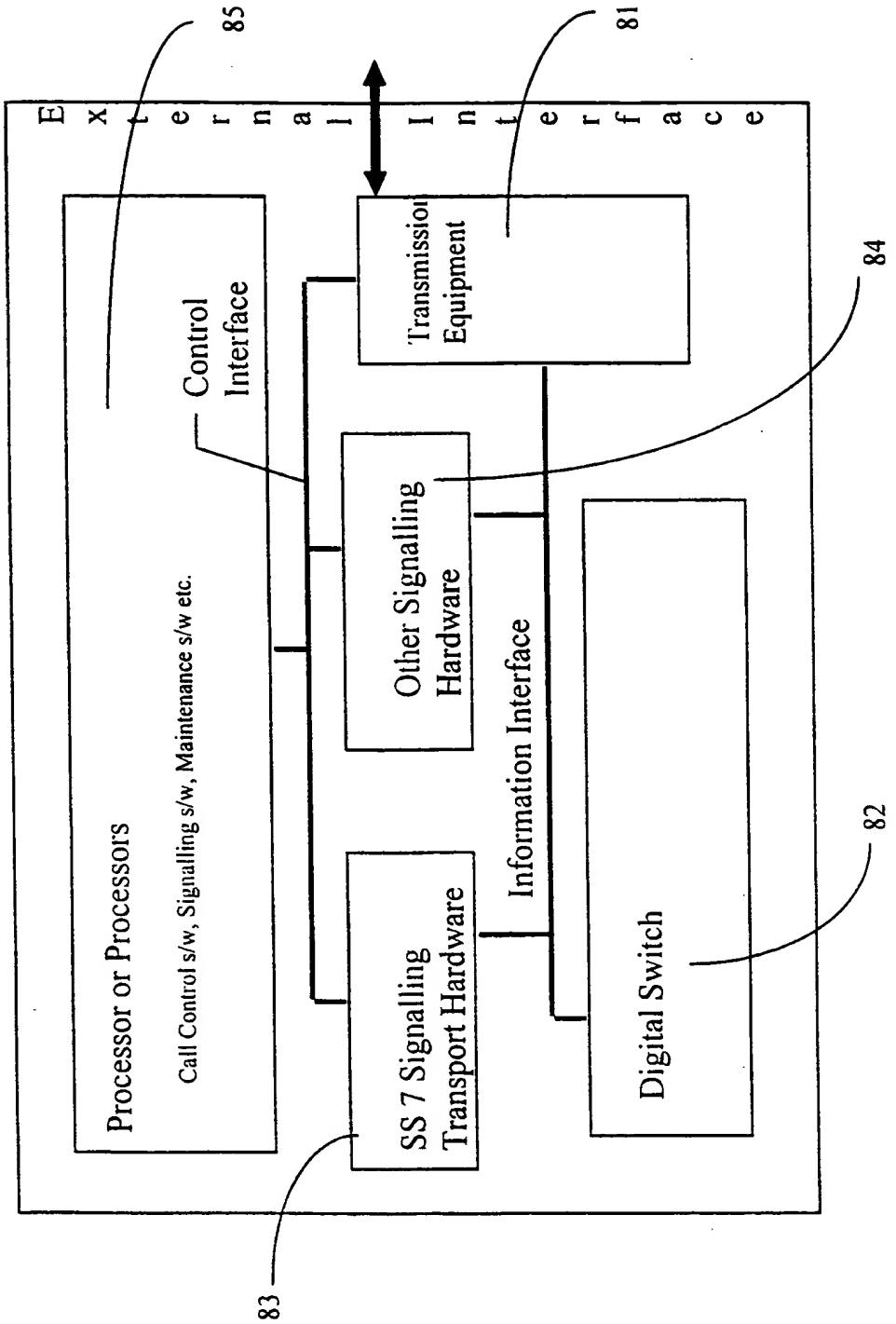

External Interface
85
81
Processor or Processors
Call Control s/w, Signalling s/w, Maintenance s/w etc.
Control Interface
Transmission Equipment
84
Other Signalling Hardware
Information Interface
Digital Switch
82
SS 7 Signalling Transport Hardware
83

Figure 9

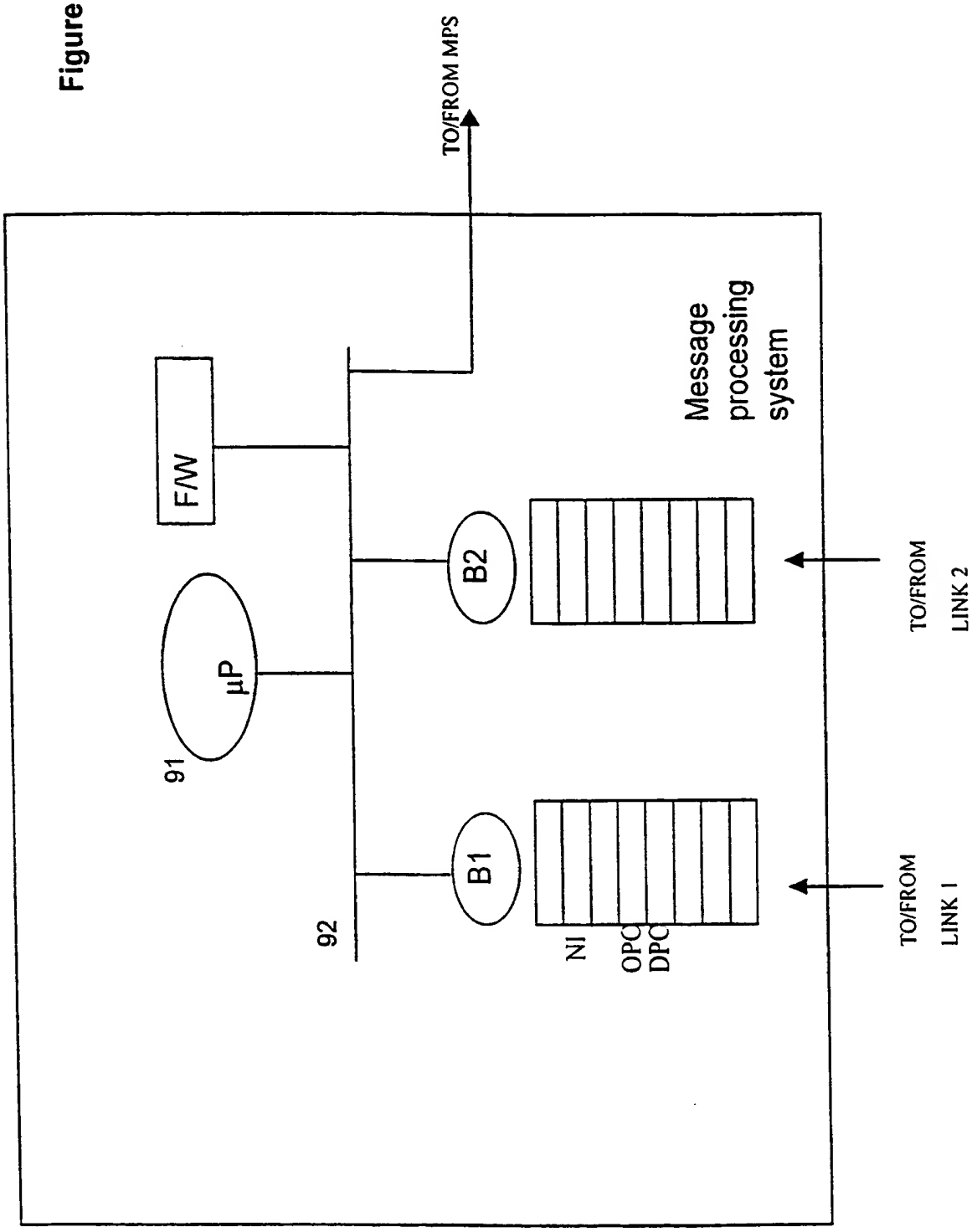
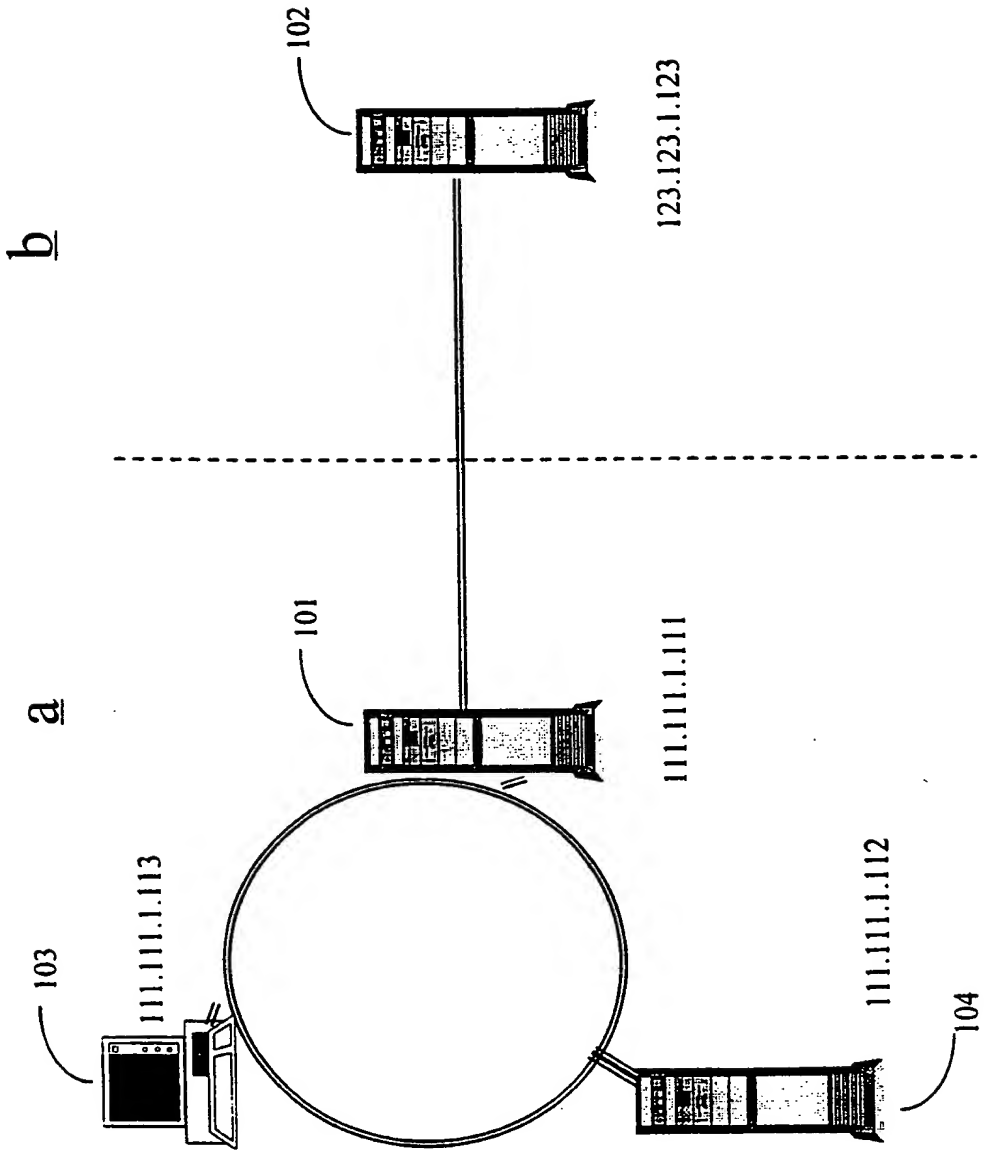

TO/FROM MPS
Message processing system
F/W
B2
µP
91
B1
92
NI
OPC
DPC
TO/FROM LINK 2
TO/FROM LINK 1

Figure 10


b
a
102
123.123.1.123
101
111.111.1.111
103
111.111.1.113
111.111.1.112
104

INTERNATIONAL SEARCH REPORT

Inte. ..tional Application No
PCT/GB 98/02808

A. CLASSIFICATION OF SUBJECT MATTER
IPC 6 H04Q3/66 H04Q3/00

According to International Patent Classification (IPC) or to both national classification and IPC

B. FIELDS SEARCHED

Minimum documentation searched (classification system followed by classification symbols)
IPC 6 H04Q

Documentation searched other than minimum documentation to the extent that such documents are included in the fields searched

Electronic data base consulted during the international search (name of data base and, where practical, search terms used)

C. DOCUMENTS CONSIDERED TO BE RELEVANT

Category °	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
X	WO 95 35633 A (BELLSOUTH CORPORATION) 28 December 1995 see page 14, line 18 - page 17, line 11 see page 18, line 6 - page 19, line 16 see page 20, line 8 - line 9 see page 22, line 10 - page 43, line 2 ---	1-16
A	EP 0 726 682 A (AT&T IPM CORP.) 14 August 1996 see the whole document --- -/--	1-16

[X] Further documents are listed in the continuation of box C.

[X] Patent family members are listed in annex.

° Special categories of cited documents :

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"&" document member of the same patent family

Date of the actual completion of the international search	Date of mailing of the international search report
10 November 1998	19/11/1998

Name and mailing address of the ISA	Authorized officer
European Patent Office, P.B. 5818 Patentlaan 2 NL - 2280 HV Rijswijk Tel. (+31-70) 340-2040, Tx. 31 651 epo nl, Fax: (+31-70) 340-3016	De Muyt, H

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INTERNATIONAL SEARCH REPORT

Int. ational Application No
PCT/GB 98/02808

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category '	Citation of document, with indication,where appropriate, of the relevant passages	Relevant to claim No.
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A	ZAHARYCHUK J ET AL: "GATEWAY SIGNAL TRANSFER POINTS: DESIGN, SERVICES AND BENEFITS" INTERNATIONAL CONFERENCE ON COMMUNICATIONS, INCLUDING SUPERCOMM TECHNICAL SESSIONS. ATLANTA, APR. 15 - 19, 1990, vol. 1 OF 4, 15 April 1990, pages 233-240, XP000147408 INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS ---	1-16
A	CHEN J C: "OPEN AIN OPERATIONS STRATEGIES" PROCEEDINGS OF THE NETWORK OPERATIONS AND MANAGEMENT SYMPOSIUM (NOM, KISSIMMEE, FEB. 14 - 17, 1994, vol. 1 OF 3, 14 February 1994, pages 140-152, XP000452403 INSTITUTE OF ELECTRICAL AND ELECTRONICS ENGINEERS see the whole document ---	1-16
A	FERGUS J E: "SIGNALING NETWORK INTERCONNECTION" PROCEEDINGS OF THE NATIONAL COMMUNICATIONS FORUM, vol. 41, no. 1, 1987, pages 560-562, XP002026349 see page 561, paragraph 3 see page 562, paragraph 4 --- -/--	1-16

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INTERNATIONAL SEARCH REPORT

Int. ..ational Application No
PCT/GB 98/02808

C.(Continuation) DOCUMENTS CONSIDERED TO BE RELEVANT

Category	Citation of document, with indication, where appropriate, of the relevant passages	Relevant to claim No.
A	SEVCIK M ET AL: "CUSTOMERS IN DRIVER'S SEAT: PRIVATE INTELLIGENT NETWORK CONTROL POINT" ISS '95. WORLD TELECOMMUNICATIONS CONGRESS. (INTERNATIONAL SWITCHIN SYMPOSIUM), ADVANCED SWITCHING TECHNOLOGIES FOR UNIVERSAL TELECOMMUNICATIONS AT THE BEGINNING OF THE 21ST. CENTURY BERLIN, APR. 23 - 28, 1995, vol. 2, 23 April 1995, pages 41-44, XP000495622 VERBAND DEUTSCHER ELEKTROTECHNIKER (VDE) ET AL	1-16
A	US 5 430 719 A (WEISSER) 4 July 1995 see the whole document	1-16

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INTERNATIONAL SEARCH REPORT

Information on patent family members

International Application No
PCT/GB 98/02808

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		CA 2165568 A	05-01-1995
		EP 0706743 A	17-04-1996
		JP 9501549 T	10-02-1997
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		US 5438568 A	01-08-1995